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The Effects of Endogenous Protection on the Economic Landscape

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The author studies the impact of political economy variables on the spatial distribution of industry. The political game between a single lobby and a partial opportunistic incumbent may alter the economic landscape of a small economy. The trade policy endogenously determined becomes the channel to understand how the players' behaviour impacts on the long run spatial distribution of industry. When the rest of the world is a free trader and the spending share of an economy is relatively small, the marginal change in the trade policy has a relevant impact on the industry share. Amazingly, if a small economy is characterised by a government that is not very much concerned about general welfare and there is a lobby of few capital owners that play actively, the possible outcome will be a relocation of industry that favours such an economy. Capital owners might make capital flow to look for protection. Political variables may act as a dispersion force.

Keywords: Agglomeration; Endogenous trade policy formation; Factor mobility; Monopolistic competition; Trade.
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1. Introduction

The location of economic activity has regained the centre of the political and economic debates since many processes of trade integration and trade liberalisation have waxed along the world. Policy makers and economists have deeply discussed the effects that such processes would have on the economic landscape trying to infer whether they would foster more divergences among nations or not. Controversial opinions have risen.

Theoretical research has advanced in this field seeking to offer an explanation of the mechanisms that may fuel spatial concentration in the economic activity. Particularly the new economic geography theory, through its different theoretical models, analyses the agglomeration and dispersion forces that govern the economic geography space. These settings introduce different sorts of motions to explain the concentration and dispersion processes. For instance, the Core-Periphery (Krugman, 1991) and Footloose Entrepreneur (Ottaviano, 1996 and Forslid, 1999) backgrounds use labour migration to drive agglomeration. The Footloose Capital model (Martin and Rogers, 1995) considers capital factor mobility to generate it. Dynamic models introduce capital accumulation and the growth rate of *knowledge* capital to feed spatial concentration (Baldwin, 1999 and Baldwin, Martin and Ottaviano, 2001).

In all these models the level of trade freeness that prevails in one economy plays an important role in defining the strength of agglomeration and dispersion processes. Both forces tend to be less effective if trade is almost completely free. However, at high level of trade costs, dispersion forces are stronger than agglomeration forces while at low level of trade costs, dispersion forces weaken faster than agglomeration forces.

From this theoretical perspective, the geographic distribution of the economic activity tends to be lumpy as nations become freer in terms of trade costs. Trade cost is a relevant variable in the *definition* of the economic landscape picture. An interesting and relevant question is, therefore, what determines it? The new economic geography theory models trade costs as an exogenous variable. The trade cost concept consists of a wide range of barriers such as transport costs and all sorts of trade policies in general. Though several of them can be viewed as exogenous parameters, others have an intrinsic endogenous nature. In fact, quite often countries design their trade policies in a way that they are the outcome of a political interaction among interest groups and governments. In this context, incumbents take policy decisions considering not only the well-being of the society but also their own political interests.

The aim of this paper is to consider those costs that are related to the political behaviour as an endogenous variable in a new economic geography setting. The idea is to build a model that may

explain the economic geography disparities among regions considering not only the economic variables but also the political ones. In order to pursue such objective, two backgrounds are interrelated. On the one hand, the Footloose Capital model (FC) is chosen to model the economic structure of a small economy. On the other hand, the political ingredient of the model is shaped taken as backbone the model of Grossman and Helpman developed in *protection for sale* (1994). Both settings share some interesting features that make the author choose them. They are parsimonious models; while the FC model qualifies because it is the most tractable model among other economic geography settings, the G-H approach has been chosen because it provides microfundations to the player's actions that are less formally specified in other political economy models[2].

The note is structured as follows. Section II presents the formal background where the economic and the political behaviours are specified. Section III shows the results of the short run when decisions of firms are focussed on lobbying activities due to the fact that capital is not mobile in this period. Section IV deal with the long run equilibrium. Section V presents some appealing insights of an *exercise*. Finally, section VI gives the concluding remarks.

2. The Framework

The economic structure takes the form of the FC model in which two regions, two sectors and two productive factors are considered. One region is small and represents the home country; the other is a large economy which can be viewed as the rest of the world. They have similar tastes and technologies. The two sectors are the industrial (the modern sector) and the agricultural (the traditional sector). The industrial sector, which produces a number of varieties, features increasing returns to scale, monopolistic competition and iceberg trade costs. The agricultural sector produces a homogeneous good under constant return to scale and perfect competition. This good is traded without frictions. The two factors are physical capital and labour. While the manufacture activity uses both factors, the agriculture sector produces the homogeneous good only employing labour. In the short run the capital factor cannot migrate. However, in the long run it moves freely between regions searching for the highest nominal reward[3]. Labour is the immobile factor.

[2] Rodrik (1995) reviewed the political economy literature. In this paper the author has stressed this advantage.

[3] Although physical capital is perfectly mobile in the long run, the FC model assumes that capital owners are completely immobile across regions. Thus, owners spend their incomes in the region where they live. This

The regions are populated by individuals with identical preferences though different endowments. The typical consumer of the small economy maximises the following utility[4]:

$$U = c_A + \mu \ln\left(nc^{\frac{\sigma-1}{\sigma}} + n^*\bar{c}^{*\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}} \quad (1)$$

where c_A is the consumption of the agricultural good, which is chosen to be the *numeraire* good. c and $\bar{c}^*$ are, respectively, the domestic and foreign differentiated industrial goods consumed by a representative resident of the small economy and n and n^* are the numbers of varieties produced in the local and foreign economies[5]. Thus, the total number of varieties available in both regions is $N = n + n^*$. μ represents the expenditure on all varieties and σ, which is assumed to be greater than 1, stands for the own and cross constant price elasticity.

The total expenditure that a typical individual devotes to both sorts of goods is given by the amount E. With quasilinear preferences, the demand functions of local and foreign goods, c and $\bar{c}^*$, are given by:

$$c = \frac{p^{-\sigma}\mu}{np^{1-\sigma} + n^*\bar{p}^{1-\sigma}} \text{ and } \bar{c}^* = \frac{\bar{p}^{-\sigma}\mu}{np^{1-\sigma} + n^*\bar{p}^{1-\sigma}} \quad (2)$$

where p denotes the price of the local differentiated good, $\bar{p}$ stands for the price of the foreign differentiated good and $\mathrm{P} = \left(np^{1-\sigma} + n^*\bar{p}^{1-\sigma}\right)^{\frac{1}{1-\sigma}}$ is the average price that prevails in the home economy. The demand function of the numeraire good equals to:

$$c_A = E - \mu \quad (3)$$

Equations (2) and (3) represent the optimal choices of an individual in terms of consumption. The corresponding indirect utility function takes the form:

$$V(\mathrm{P}, E) = E + \mu\left[Ln\left(\mathrm{P}^{-1}\mu\right)\right] - \mu \quad (4)$$

where $s(\mathrm{P}) = \mu\left[Ln\left(\mathrm{P}^{-1}\mu\right)\right] - \mu$ is the consumer surplus that each individual derives from the consumption of varieties.

The two productive sectors use different technologies. The technology of the agricultural sector is modelled as simply as possible. This sector uses only labour to produce the traditional good under constant returns to scale. It requires one unit of labour to make one unit of the numeraire

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assumption prevents the model from presenting the circular causality characteristic. Though this absence makes the FC model totally tractable, it brings the disadvantage of losing the self-reinforcing mechanism that agglomeration forces present in other economic geography models.

4 The rest of the world has an identical economic structure. All variables of the large economy are symbolized by an asterisk.

5 One of the results in the Dixit-Stiglitz monopolistic competition model is that there is one firm per variety and one variety per firm.

good, $a_A = 1$. The aggregate supply of labour is sufficient to ensure a positive supply of this good. ***As a result of these assumptions, the wage rate of labour,*** w_l***, equals 1.*** Labour factor is considered to be immobile across regions but mobile across sectors.

The industrial sector exhibits increasing return to scale. A typical firm faces a cost function which is not homothetic[6]. The fixed cost includes only the reward of capital while the variable cost involves the retribution of the labour factor:

$$TC = \pi K + a_m X w_L \quad (5)$$

where π is the reward of capital, a_m is the input-output requirement of labour and $X = x + \bar{x}$ is the total supply of a typical firm. To keep the cost structure in a simple fashion, it is assumed that each firm requires only one unit of physical capital, that is $K = 1$.

Each firm can sell its production in the local market or abroad. When domestic varieties are sold in the large region, local firms face an iceberg trade cost, τ^*. Similarly, when a foreign firm wants to sell its production in the small economy, it faces a trade cost equal to τ, which in this setting arises endogenously. The maximization problem of a local firm gives the following pair of prices:

$$p = \frac{\sigma}{\sigma - 1} a_m \text{ and } \bar{p}^* = \tau^* \frac{\sigma}{\sigma - 1} a_m \quad (6)$$

where p is the price of the domestic variety that prevails in the small economy and $\bar{p}^*$ is the price of the domestic variety that prevails in the large economy. $\frac{\sigma}{\sigma - 1} > 1$ is the mark up that the local firm charges above the marginal cost, a_m. As one can see, $\bar{p}^* = \tau^* p$. Similar results hold for a foreign firm. The maximization problem of a foreign firm gives the prices for the foreign variety in each market:

$$p^* = \frac{\sigma}{\sigma - 1} a_m^* \text{ and } \bar{p} = \tau \frac{\sigma}{\sigma - 1} a_m^* \quad (7)$$

where p^* is the price of the foreign variety that prevails in the foreign economy and $\bar{p}$ is the price of the foreign variety that prevails in the small economy. In this case, $\bar{p} = \tau p^*$. Moreover, since both economies are assumed to have the same technology in both sectors, $a_m = a_m^*$, domestic and foreign varieties have the same price in domestic and foreign markets respectively, that is $p = p^*$. However, an asymmetry in prices between both regions arises since trade costs are generally different, $\bar{p} \neq \bar{p}^*$.

[6] The factor intensity of the fixed cost differs from the factor intensity of the variable cost.

In the small economy, the government has as unique tool an import tariff to influence the internal prices of varieties because the homogeneous good is traded without frictions[7]. The government introduces a wedge between the internal and foreign price if it decides to set such a tariff. The tax revenue that the incumbent derives from this policy, in per capita terms, is given by:

$$r = n^*(\tau - 1)p\bar{c}^* \quad (8)$$

The government redistributes the tax income equally among individuals. Individuals also derive income from alternative sources. Each resident derives income as owner of that their incomes are influenced by the external competition *one unit* of labour and also possibly as owner of capital factor. It is assumed that individuals may have at most one unit of capital, which is used to produce a particular variety. Those individuals that have some unit of physical capital will perceive n of foreign differentiated goods. For this reason, they will be interested to prevent such competition via a tariff applied to all foreign varieties. A higher tariff increases the average price of the small economy since $\mathrm{P} = \left(np^{1-\sigma} + n^*\bar{p}^{1-\sigma}\right)^{\frac{1}{1-\sigma}}$ and $\bar{p} = \tau p^*$. As it can be seen from equation (2), a higher average price tends to increase the demand of the local differentiated good, which of course favours local firms.

In the short run, capital cannot flow from one region to the other in order to look for higher nominal rewards. Hence, owners of the specific capital will try to increase their income by an alternative way, avoiding the external competition. Since they have a common interest in doing that, they may choose to join forces for political activity. It is assumed that capital owners can overcome the free-rider problem that arises in collective actions and organise themselves into an interest group.

The lobby that represents the interest of capital owners makes political contributions contingent on the tariff imposed by the government. $C_g(\tau)$ denotes the contribution schedule offered by the lobby. The lobby chooses the optimal level of the contribution maximizing its total net welfare $V_g = W_g - C_g$. The gross welfare is given by:

$$W_g = l_g + \sum_{i=1}^{n} \pi_i\left[p, \mathrm{P}(\tau)\right] + \alpha_g\left[R(\tau) + S(\mathrm{P}(\tau))\right] \quad (9)$$

where l_g is the total labour supply of capital owners, π_i is the profit of a firm that produces a particular variety *i*, α_g is the fraction of the voting population that owns the capital input and belongs to the lobby, $R(\tau) = Ir(\tau)$ is the total tax revenue, $S(\mathrm{P}(\tau)) = Is(P)$ stands for the aggregate consumer surplus, and I represents the total population of the small economy.

[7] For simplicity, it is assumed that trade cost are only the sort of ad-valorem tariff barriers.

As in Grossman and Helpman (1994), the government is interested in both the level of contribution and in the well-being of all individuals. The incumbent cares about the total amount of contributions because they are a potential source of economic funds to finance campaign spending. Contributions also may provide to politicians other direct benefits rather than those devoted to improve their chance of being re-elected[8]. The well being of the society also is of concern to the government due to the fact that individuals, as voters, are more likely to re-elect a government that has taken actions to improve their standard of living. Hence, the linear objective function that reveals the government's preferences just equals to:

$$G = C_g + aW(p, \mathrm{P}(\tau)) \qquad (10)$$

where a is the weight that government attaches to the society's welfare relative to the amount of campaign contributions and W is the aggregate welfare given by:

$$W = l + \sum_{i=1}^{n} \pi_i [p, \mathrm{P}(\tau)] + [R(\tau) + S(\mathrm{P}(\tau))] \quad (11)$$

l is the total income of labour factor since $w_l = 1$. Aggregate welfare also comprises the total income of capital owners, the total tax revenue and the aggregate consumer surplus.

Political activity governs the scene of the short run. The model has the structure of the principal-agent problem. This situation arises when a principal attempts to persuade an agent to take an action that may be costly for the agent to perform. Following Grossman and Helpman (1994) the political ingredient considers two kinds of actors. First, a single interests group, which is the *principal,* serves to coordinate campaign contributions and to communicate the political offers to the incumbent. The lobby chooses its contributions maximizing the net welfare of its members. Contributions are linked to the trade policy implemented by the incumbent. Second, an incumbent government, which acts as the *agent,* maximises its own objective function given by equation (10).

The sequence of the model is as follows. The short run is characterised by a two-stage noncooperative game in which the lobby chooses its political contribution in the first stage and the government sets the trade policy in the second. The short run equilibrium gives the optimal levels of contribution and trade policy, which is reflected by a parameter that measures the level of freeness. In the long run, firms can move from one region to the other looking for the highest nominal reward. The long run equilibrium gives the optimal number of firms in each region which depends on the optimal level of freeness given by the short run equilibrium.

[8] Mitra, Thomakos and Uluba□o□lu (2002) emphasise that in dictatorships the "other sort of benefits" are the main reason why dictators are also interested in contribution funds.

3. The Short Run equilibrium

Grossman and Helpman (1994) assume that the interaction between lobbies and the government takes the form of a *menu auction* in the sense of Bernheim and Whinston (1986). In proposition 1 of *protection for sale* authors characterise the equilibrium of the trade policy game where the economic structure features perfect competition among sectors, the technology is governed by constant returns to scale and trade policies are of a wider range[9]. This paper follows the G-H approach assuming the same kind of interaction between the government and a single lobby. In this background, if the contribution function is differentiable and the equilibrium price maximises both the welfare of the particular lobby and the government's objective function, the lobby may choose a contribution that is *locally truthful*. Such a contribution schedule has the interesting property that a marginal change in the contribution mirrors the marginal change in lobby's welfare when both changes are caused by a marginal change in the tariff, that is:

$$\frac{dC_g^{\circ}(\tau^{\circ})}{d\tau} = \frac{dW_g^{\circ}(p^{\circ}, P^{\circ}(\tau^{\circ}))}{d\tau} \quad (12)$$

In equilibrium, truthful contributions induce the government to behave as if it were maximising $aW + W_g$[10]. In this case, the objective function of the government is characterized by a social-welfare function that weights the members of society differently. Lobby's members receive a weight of $(1+a)$ and individuals that are not organized receive a smaller weight of a[11]. The first order condition of this problem is:

$$\frac{dW_g^{\circ}(p^{\circ}, P^{\circ}(\tau^{\circ}))}{d\tau} + a\frac{dW(p^{\circ}, P^{\circ}(\tau^{\circ}))}{d\tau} = 0 \qquad (13)$$

Equation (13) characterises the equilibrium domestic tariff, and consequently the equilibrium of domestic prices, of all varieties supported by the differentiable contribution function.

To look for the derivatives of the lobby's welfare and the aggregate welfare with respect to the tariff, first a final expression for profits of a typical firm has to be calculated:

$$\Pi = \left(pc + \bar{p}^{*}\bar{c}\right) - \left[\tau + a_m(x + \bar{x})\right] \quad (14)$$

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9 The authors consider the possibility of negative protection. In their model, the government can introduce not only import tariffs but also export taxes and import and export subsidies in the n sectors.

10 One can decompose total welfare to obtain $a\sum_{i \notin g} W_i + (a+1)W_g$.

11 Goldberg and Maggi (1999) have pointed out that the same trade policy outcome may arise when, instead of assuming a menu-auction problem, it is assumed a Nash bargaining game. In fact, in a bargaining solution trade policies are chosen to maximise the joint surplus of players; $\beta W + (1-\beta)W_g$.

Replacing the demand functions given by equations (2) and the marginal cost expression, $a_m = p\frac{\sigma-1}{\sigma}$, in equation (14) and considering the fact that the market clears when $\left(c + \tau^* \bar{c}\right) = x + \bar{x}$, one can rewrite profits as:

$$\Pi = \frac{1}{\sigma}\left[\frac{\mu I}{n + n^* \tau^{1-\sigma}} + \frac{\tau^{*1-\sigma}\mu^* I^*}{n^* + n\tau^{*1-\sigma}}\right] - \pi \quad (15)$$

where μ^* represents the expenditure on all differentiated goods in the large economy. Equation (15) can be expressed in terms of the spatial distribution of expenditure, $s_\mu = \frac{\mu I}{\Xi^w}$ and $1 - s_\mu = \frac{\mu^* I^*}{\Xi^w}$ where $\Xi^w = \mu I + \mu^* I^*$ is the total world expenditure in varieties, and in terms of the spatial distribution of industry, $s_n = \frac{n}{N}$[12].

$$\Pi = \frac{1}{\sigma}\left[\frac{s_\mu}{s_n + (1 - s_n)\tau^{1-\sigma}} + \frac{\tau^{*1-\sigma}(1 - s_\mu)}{(1 - s_n) + s_n \tau^{*1-\sigma}}\right]\frac{\Xi^w}{K^w} - \pi \quad (16)$$

The marginal changes in aggregate welfare and in lobby's welfare due to a marginal change in the tariff are given by the sum of the marginal changes in profits, total tax revenue and aggregate consumer surplus. As expected, the marginal policy change affects profits positively. Such change has two different impacts in the tax revenue. On the one hand, a positive direct effect which reflects the fact that when the tariff changes, the income revenue changes in the same direction for a certain level of imports. On the other hand, an indirect negative effect, which shows the change in import quantities as the tariff is modified. Finally, the effect of the marginal change in the tariff on the aggregate consumer surplus is, of course, negative.

Replacing the impacts of the tariff change on profits, on the total tax income and on the aggregate consumer surplus into equation (13), the following expression arises in the short run:

$$\left[-(1 - s_n)\tau^{1-\sigma} + \tau^{-\sigma}(1 - s_n) + \tau^{-1}\sigma s_n\right] = -\frac{(1 + a)}{(\alpha_g + a)}\frac{(\sigma - 1)}{\sigma}s_n + \sigma s_n \quad (17)$$

Equation 17 can be written in terms of a freeness parameter as:

$$\left[-\phi + \phi^{\frac{\sigma}{\sigma-1}} + s_n\left(\phi - \phi^{\frac{\sigma}{\sigma-1}} + \phi^{\frac{1}{\sigma-1}}\sigma\right)\right] = -\frac{(1 + a)}{(\alpha_g + a)}\frac{(\sigma - 1)}{\sigma}s_n + \sigma s_n \quad (18)$$

[12] The assumption of 1 unit of capital per firm implies that $N = K^w$, where K^w is the total stock of physical capital in the world .

where $\phi = \tau^{1-\sigma}$ represents a measure of freeness that takes values among zero and one. As τ increases, ϕ tends to zero. By contrary, when differentiated goods are almost traded freely[13], ϕ is near to one. Equation (18) cannot be solved in general for the degree of freeness, ϕ, since such level in the left hand side has different powers in each term. The left hand side (LHS) of equation (18) can take positive, null or negative values. It takes positive values for admissible values of $\sigma > 1$ and $0 < s_n < 1$. The higher the value of σ, the higher the probability that the LHS expression is positive for a particular s_n. For small values of s_n the LHS expression can be still positive, however as s_n tend to zero, it tends to be negative. A necessary condition for the LHS of equation (18) to be positive is that $s_n \sigma \phi^{\frac{1}{\sigma-1}} > (1 - s_n)\left(\phi - \phi^{\frac{\sigma}{\sigma-1}}\right)$ (C1). If the left hand side (LHS) is positive, as ϕ increases, the LHS increases. A sufficient condition for this positive relation is that $\phi^{\frac{1}{\sigma-1}} > \frac{\sigma - 1}{\sigma}$ (C2) [14]. Though one cannot obtain from (18) a final expression to measure the level of protection, it might be interesting to consider the LHS as a proxy of the inverse of such measure and analyse how it is influenced by the political and economic variables. Some constructive predictions arise from this approximation.

Like one of the relevant outcomes of the Grossman and Helpman's approach, equation (18) confirms that when the incumbent has a remarkable concern for the well-being of the society, it will avoid creating an important excess burden via the introduction of a high tariff. Hence, for a high value of a, the LHS of equation (18) will also be high.

As the share of voters who are members of the interest group increases, the level of trade freeness also increases. Though this result is also one of those that Grossman and Helpman obtain, the explanation here is somewhat different. In a setting in which many lobbies interact, the fact that lobbies want to increase its domestic price but lower the prices of the other goods in order to avoid the excess burden as consumers, generates a competitive mechanism that neutralise the lobby's actions one another. Here, with only one interest group as *principal*, the competition effect is absent. However, the members of the lobby, as consumers, also want to avoid the high social cost of a protective tariff. The deadweight loss that the lobby faces

[13] When trade is completely free, $\tau = 1$. However in this setting with monopolistic competition, when the incumbent maximizes the general welfare, the outcome is a second best optimal tariff. Therefore, ϕ would tend to be less than one.

[14] This condition does not hold for values of ϕ near to zero and values of σ near to one.

increases as the share of population who belongs to the lobby also increases[15]. However, the extra profits that the group as a whole obtain because of the implementation of the tariff do not change with changes in α_g. The negative effect of the distorted tariff that impacts in the welfare's lobby would turn out to be relatively more important than the positive effect of the extra benefit for high values of α_g. The incentive to lobby for a tariff would diminish as the share of the individual that belongs to the interest group increases. Hence, the optimal trade policy for the government might be one which is near to the second best optimal tariff that such government would choose when it maximizes the general welfare. When $\alpha_g = 1$, the LHS equals to $\frac{s_n + s_n\sigma(\sigma-1)}{\sigma}$, which is positive since by assumption $\sigma > 1$. If $\alpha_g \cong 0$, the fraction of population that owns the capital factor is very low. The LHS is positive when $a > \frac{1}{\sigma - 1}$ (C3), holds. In this case, a high level of free trade is the probable outcome when the demand elasticity is relatively high[16] and the government is well concerned about the general welfare.

As formula (18) describes, the mark-up that firms set over the marginal cost also influences the LHS proxy. As the inverse of the mark up, $\frac{\sigma - 1}{\sigma}$ increases, the proxy expression of the level of freeness diminishes. That is, if the mark-up that firms can charge is low, the level of protection will be high. Since firms cannot improve their benefits via a high mark-up, they will try to increase them by increasing the quantities of the goods that they can sell in the local market. Therefore, they will try to avoid the external competition of foreign firms in order to capture a higher share of the local market. It seems to be that at a lower mark up, the lobby is more worried to persuade the government to set a high tariff. The more elastic the demand of varieties, the less the mark up that firms charge; hence the more the incentive of the lobby to increase its profits via the political alternative measure.

However, though lobbies would persuade the government to introduce a tariff when the elasticity is high, the incumbent will follow the Ramsey rule when $1 > \frac{(1+a)}{(\alpha_g + a)}\frac{1}{\sigma^2}$, (C4), holds. The political cost that government may bear increases with the excess burden that individuals have to face when the incumbent set a tariff. The excess burden associated with the protectionist measure

[15] The negative impact that the tariff has in the consumer surplus is multiplied by the total number of people that belongs to the lobby.

[16] That is when the deadweight loss is important.

is higher at higher demand elasticity[17]. When $a > 0$, the condition (4) will hold for high values of a and σ. Moreover, though $a = 0$, the government would follow the Ramsey rule. Similar reasoning explained in the previous paragraph applies. If the proportion of the society that belongs to the lobby is high, α_g, the lobby's welfare will be more affected by the negative effect that the tariff imposes to its members as consumers than the positive effect that members can derive through it as owners of capital. Therefore, it is more likely that the government sets a wedge between the domestic and foreign prices when the demand elasticity is low, since the deadweight that the incumbent introduces in this case is lower.[18]

The spatial distribution of firms also seems to influence the structure of protection in one economy[19]. The relationship between the industry share and the inverse of the level of protection is a priori ambiguous. On the one hand, one might expect that concentration of firms in one region would reflect the political power of the industrial sector since the gains that producers would obtain from an increase in protection would be magnified by the number of firms. In this case, the lobby would have much to lose from a free trade policy and therefore would bid more actively for protection. But, on the other hand, the presence of a high number of firms in such economy involves a tight level of competition among firms that tends to lower the potential gains that capital owners would derive from the protectionist policy. In fact, when the local competition is important, foreign competition and the lobbying activity to avoid it become irrelevant. The relationship between the given industrial share and the level of freeness will be positive if the following inequality holds:

$$1 > \frac{(1+a)}{(\alpha_g + a)} \frac{\sigma - 1}{\sigma} \frac{1}{\sigma} \quad \text{(C5)}$$

If the sing of condition (5) is inverted, the relation is negative. Finally, a particular distribution of industry might not influence the level of freeness when this level is too small, that is when the economy is very much closed. For a level of freeness near to zero, the expression (18) approximates to:

$$\phi^{\frac{1}{\sigma-1}} = -\frac{(1+a)}{(\alpha_g + a)} \frac{(\sigma - 1)}{\sigma^2} + 1 \quad (19)$$

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[17] The excess burden is the sum of the gain of producers, the gain in government revenue and the loss of consumer surplus.

[18] The effect of the elasticity of substitution is not easy to visualise since such variable is also present in the LHS of equation (18).

[19] Some caution have to be taken when one analyses the impact of s_n on the level of freeness due to the fact that this variable is also present in the LHS of equation (18). However, interesting plausible insights rises from the following analysis.

where $\phi^{\frac{1}{\sigma-1}} = \tau^{-1}$ also a measures the degree of trade freeness. In this case, the economic variables that affect the level of protection are the demand elasticity and the level of the mark up, which depends on the elasticity. The protectionist government follows the Ramsey rule as long as $\sigma > 2$. Political variables impact in the level of protection in a similar manner as they do in the general case.

Political Contributions

The characterisation of the equilibrium (equation 13) involves the fact that the interest group may offer contributions that are locally truthful[20]. When the lobby plays truthful contributions, it will choose the maximum level of its net welfare in such a way that will induce the government to select the lobby's most preferred trade policy. Since the lobby aims to increase its net welfare (B_g)as high as possible, it will do it by diminishing the level of contribution until making the government be *indifferent* between the trade policies that it can choose. In this case, the incumbent has two alternative possibilities; it can select the lobby's most preferred policy, τ°, or the one that maximises the general welfare. As mentioned above, when the government maximises the general welfare, it will choose a second best small tariff, as there exists a distortion in the economy due to the monopolistic pricing rule. This tariff, τ^{W}, will be lower than that of the lobby's most preferred. The equilibrium campaign contribution that satisfies the incumbent's indifferent situation is equal to $C_g\left(p^{\circ}\left(\tau^{\circ}\right)B_g\right) = aW\left(p\left(\tau^{W}\right)\right) - aW\left(p^{\circ}\left(\tau^{\circ}\right)\right)$.

As Grossman and Helpman (1994) have pointed out, when there is only a single organized interest group, it contributes to the government an amount that is proportional to the excess burden that the equilibrium trade policy imposes on society. The proportionality component is given by the relative weight that the incumbent sets on the general welfare. The excess burden is given by the sum of the gain in the producer surplus when the government chooses the lobby's most preferred equilibrium tariff, the tax revenue that the government derives from such policy and the loss of consumer surplus because of the election of the protectionist policy. In this case, the government payoff is equal to $G = aW\left(p\left(\tau^{W}\right)\right)$, just the same to the one that the incumbent would derive if it were implemented a second best trade policy.

[20] The consideration of truthful contributions restricts the set of Nash equilibria that emerge when contribution are assumed to be differentiable to the set of truthful Nash equilibria supported by truthful bids functions. Bernheim and Whinston (1986) have shown that a player can substitute a truthful strategy for a non-truthful one without facing any additional cost. Since these strategies are also coalition proof, they have argued that truthful Nash equilibria may be focal among the set of Nash equilibria.

4. The Long Run Equilibrium

The key feature of the long run is the mobility of the capital factor. Unlike the short run, capital owners can move their endowment from one region to the other looking for the highest nominal rewards. In this context, the long run equilibrium is only achieved when there is no incentive for the capital to migrate. This situation happens either when the capital earns the same retribution in both regions or when such factor is agglomerated in one of the two regions and this region pays the highest reward. One can visualise two types of long run equilibria; the interior ones which equalise profits between regions, $\pi = \pi^*$, or the core-periphery outcomes in which $s_n = 0$ and $\pi < \pi^*$ or $s_n = 1$ and $\pi > \pi^*$. Focusing on interior outcomes, the equilibrium division of industry equals to:

$$s_n = -\frac{\phi}{(1-\phi)} + \frac{(1-\phi\phi^*)}{(1-\phi)(1-\phi^*)} s_\mu \quad (21)$$

where $\phi^* = \tau^{*1-\sigma}$ characterises the foreign level of freeness which is considered as an exogenous variable. Equation (21) shows the positive relationship between the share of industries located in the small economy and the spatial distribution of expenditure in differentiated goods. Such relation reflects the fact that a high market size in one region tend to encourage concentration of firms in that economy. The process involves the interaction of two opposite forces. On the one hand, monopolistic firms desire to locate their production in the largest market in order to increase their sales and profits and export to small ones when trade barriers are present. Such behaviour is a distinctive characteristic of the monopolistic industry and defines the so-called *market access effect,* an agglomeration force. On the other hand, however, firms want to avoid competition locating their production in regions in which there are fewer competitors. This effect is called the *market crowding effect* and represents a dispersion force. Both forces make up the *home market effect* which highlights the outcome that for an exogenous change in the share of market size, the relocation of firms is more than proportional to that exogenous change, that is $\frac{\partial s_n}{\partial s_\mu} = \frac{(1-\phi\phi^*)}{(1-\phi)(1-\phi^*)} > 1$.

The *home market effect* depends crucially on the levels of freeness of the home economy and the rest of the world. When protection diminishes and both economies become freer in terms of trade, the home market effect gets more powerful. The reduction in protection weakens the two forces, the *market access* advantage and the *market crowding* disadvantage. However, the fall in the tariff weakens the dispersion force in a higher speed than it weakens the agglomeration force. Hence, freer trade magnifies the degree of relocation of firms; capital becomes more footloose as

the level of trade freeness increases. Algebraically, these effects can be reflected by the following partial derivatives:

$$\frac{\partial HME}{\partial \phi} = \frac{1}{(1-\phi)^2} > 0 \text{ and } \frac{\partial HME}{\partial \phi^*} = \frac{1}{(1-\phi^*)^2} > 0 \quad (22)$$

The reasoning behind this argument is that as trade gets freer, competition from firms that are located in the other economy becomes as important as the competition that a firm faces from those firms that are located in the same region. The *market crowding* disadvantage of being in the larger market turns into an irrelevant problem. Hence, the incentive to relocate the capital factor from one region to the other in order to avoid competition vanishes; the competition is not very much localised at a low level of tariff barriers. The advantage of producing in the larger market*, the market access* effect, also erodes as the level of freeness increases since firms can have access to all markets when barriers are dismantled wherever they are installed.

Since in the short run the level of protection in the small economy is determined in terms of the political and economic variables, one can define implicitly the *home market effect* in terms of such variables, that is:

$$HME = f(\phi(a, \alpha_g, \sigma, \bar{s}_n)) \quad (23)$$

When the government has a valuable concern for the well-being of individuals, the share of voters who are members of the interest group, the mark-up and the constant elasticity are high, the home market effect becomes powerful since the level of freeness tends to be relatively high. An exogenous positive change in the market size will trigger a more than proportional change in the location of industry.

An interesting issue arises when one considers the initial spatial distribution of industry. The home market effect may be affected by the initial share of firms since, as mentioned above, it affects the level of freeness. However, the direction of such impact is a priori not determined. If condition (5) holds, a high initial share will reinforce the home market effect. When the economy is too closed, the initial distribution of industry does not impact on the home market effect.

Equation (21) shows that the location of industry depends not only on the market size but also on other term. The first expression in the RHS of equation (20) is also related to the level of freeness. Hence, the total impact of the level of freeness on the spatial location is given by the following expression:

$$\frac{\partial s_n}{\partial \phi} = -\frac{1}{(1-\phi)^2} + \frac{1}{(1-\phi)^2} s_\mu \quad (24)$$

When trade costs are asymmetric, they affect the location of industry differently. In fact, a high level of protection in one economy creates a positive profit gap that favours such economy. The

difference in profits stimulates capital to flow from the region with a high level of freeness to the one with a high level of protection. While the level of freeness of the home economy affects the share of local industries negatively, the level of freeness of the foreign economy affects the industry share of the local region[21] positively.

A government that scarcely weights the welfare of individuals in the short run and set a high tariff will tend to induce a relocation of firms to its economy in the long run. Such relocation in favour of the relatively closed country is also probable when the owners of capital that are part of the lobby are few in number, the mark-up that firms can charge is low and the demand of varieties is relatively inelastic. Moreover, the likelihood that such an economy may be the host of foreign firms, increases when the foreign country is a free trader.

The market size

Since market sizes are also relevant variables that define the economic landscape between regions, it is a useful task to fully characterise them. Market shares are defined by the total income that local individuals spend on differentiated goods in each market in terms of the total world spending on such goods. In the quasilinear utility function (equation 1) the intensity parameter, μ, which reveals the preferences for varieties, is assumed to be common to all individuals in one region. However, though identical inside each region, it may differ across countries; $\mu \neq \mu^*$. Hence, the total spending of differentiated goods is simply $\Xi = I\mu$ in the home region and $\Xi^* = I^*\mu^*$ in the foreign country and the sum of both represents the total world spending on differentiated goods, Ξ^w. The local market size is therefore $s_\mu = \frac{I\mu}{\Xi^w}$ and the foreign market size is equal to $1 - s_\mu = \frac{I^*\mu^*}{\Xi^w}$[22].

As it was mention above, in every region each individual is endowed with one unit of labour and possibly one unit of capital; accordingly the *home* population equals the number of labour factor, $I = l$. The Labour force of the home economy can be expressed in terms of total world labour endowment, $I = s_l L^w$ where $L^w = l + l^*$ and $s_l = \frac{l}{L^w}$. The relative home market size is therefore:

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[21] The impact of the foreign level of freeness on the industry share is $\frac{\partial s_n}{\partial \phi^*} = \frac{1}{(1-\phi^*)^2} s_\mu > 0$.

[22] The quasilinear structure of preferences implies that income effects are absent; hence consumer spending on differentiated goods is independent of income.

$$s_\mu = \frac{s_l}{s_l + (1 - s_l)\mu^*/\mu} \quad (25)$$

Equation (25) expresses the relative market size of the home economy in terms of its endowment share of world labour and the ratio of the intensity measure of preferences for varieties. The more skewed local individuals' preferences for differentiated goods in comparison with those of the foreign economy, $\frac{\mu^*}{\mu} < 1$, the bigger the relative market size. Also a higher share of the labour factor implies a higher market size.

What does small economy mean?

The terms "*small economy*", "*domestic economy*" and "*home economy*" have been used to refer to the economy which is analysed without precisely defining in terms of which parameters the economy might be considered *small*. The term *small economy* was used to highlight the existence of some kinds of asymmetries in the model beyond the one that exists in trade costs without explicitly specifying which asymmetries were taking place.

Uneven regions may arise because of differences in market size and in factors endowments. The domestic economy can be small due to the fact that its relative market size is low, $s_\mu < 1/2$. Equation (25) defines the market share in terms of the intensity ratio of preferences and the labour share of world labour endowment. Therefore, a low relative market size can be the result of a relative lower expenditure on differentiated goods by local individuals, a smaller population in the home country, or both. The economy also might be small in terms of the capital endowment, that is $s_k < 1/2$.

When differences between regions are the outcome of differences in market share, a small size spurs firms to locate in the larger region; the market access advantage operates in favour of the rest of the world. However, the small economy has the advantage of being the region in which firms face less competition. A dispersed equilibrium is the likely result when trade costs are high since the small region protects pretty well its industry from the competition of the large region. As equation (24) shows, though a lower trade cost boosts the impact of s_μ on s_n, since $s_\mu < 1/2$, such impact is not the one that predominates in the definition of the geographical distribution of firms. There is a process of delocation of firms from the small region to the large one as long as the tariff starts to fall. The political game can prevent such a delocation when the local lobby has the incentive and succeeds in the short run to persuade the government to set a high tariff, or when the incumbent scarcely cares about the general welfare or both.

If the economy is small in terms of its capital endowment, an interesting issue to analyse is whether the region is an importer or exporter of such factor. The difference between the share where the capital factor is employed, s_n, and the spatial distribution of capital owners, s_k, gives the direction of capital flows. When:

$$\frac{s_\mu - \phi + \phi\phi^*(1 - s_u)}{(1-\phi)(1-\phi^*)} \geq 1/2$$

holds, the small economy hosts the foreign capital. Because of similar arguments expressed above, this situation is likely to occur when the local government implements a high tariff, when the foreign government follows a free trade policy and when the small economy is not too small in terms of the market size.

Stability

In the economic geography theory, a common practice to analyse the stability of equilibria is to differentiate the profits gap with respect to the share of firms and to evaluate the derivative at the equilibrium of the spatial distribution of firms. Particularly, $\frac{\partial(\pi - \pi^*)}{\partial s_n} < 0$, whatever the equilibrium value of s_n. Baldwin *et. al.* have valuated the differential of the profit gap with respect to s_n at the equilibrium expression (19). They show that the interior equilibrium is always stable. When one of the economies presents higher nominal profits, the fact that the capital factor will flow from the region that has lower profits to the one with higher nominal rewards, will tend to diminish the profit gap due to a fiercer competition. Migration of firms will stop when the positive gap of profits vanishes. The interior equilibrium is always stable.[23]

5. An exercise

The aim of this section is to present some intuitive comments about the theoretical model and its prediction power taking into account the political parameters that have been estimated in empirical papers. Though far from replicating the real *state* and presenting robust outcomes, some useful insights might arise from this exercise.

[23] The absence of the circular causality feature prevents the model to present unstable outcomes since agglomeration forces are not reinforced by capital migration.

Recently, several authors have found empirical support for the fundamental predictions of the Grossman and Helpman's model[24]. Goldberg and Maggi (1999) and Gawande and Bandyopadhyay (2000) have confirmed that the structure of trade protection in the United Stated in 1983 is consistent with the theoretical predictions of *protection for sale*. Mitra, Thomakos and Ulubaşoğlu (2002) have also found support of the model for Turkey both under dictatorial and democratic regimes. Calfat, Flôres and Gáname (2003) have studied whether countries that make up the Mercosur agreement would evidence endogenous protection in the formation of their tariff structure.

Authors have also estimated the key structural parameters of the political economy model, the weight that governments attach to the general welfare and the fraction of the population that belongs to interest groups. In this section such parameters are used to perform a helpful exercise. Though these parameters are estimated assuming a different economic background, it would be interesting to see how endogenous protection would alter the economic landscape.

Table 1 shows the outcomes for the United State (1983), Turkey (1983, 1988 and 1990) and Brazil and Uruguay (1995). Using equation (18), the level of freeness is endogenously determined for a particular value of the industry share which is given in the short run.[25]

Particularly, Goldberg and Maggi (1999) obtain a fairly high estimated fraction of the total individuals represented by a lobby for the US economy. Also the relative weight of welfare in the government objective is very high. Assuming that the US industry share is 20%, we can obtain the level of freeness. The last two columns present such measure for two different values of the elasticity parameter[26]. The level of freeness seems to be quite high. As the authors have argued, the Grossman and Helpman model is consistent with the data; however the magnitude of political considerations in the government's objective is small.

[24] Though using different methodologies and different policy instruments of protection, all of the above papers have obtained similar qualitative outcomes. They found that protection of the organized sector is negatively related to import penetration while protection of the unorganized sector is positively related to import penetration. The modified Ramsey rule also finds support in some of these studies.

[25] These shares have been calculated using as a proxy variable the ratio of the Gross Domestic Product of an individual country over the Total World Domestic Product. The data have been taken from the World Bank Indicators database.

[26] These values are the common ones used in some numerical simulations.

Table 1: Sensitivity analysis: the short run equilibrium level of freeness

Studies	Country	Parameters			Level of freeness	
		α_g	$\beta = \frac{\alpha}{1+\alpha}$	s_n	ϕ σ□□□□	ϕ σ□□□□
Goldberg and Maggi (1999)	US 1983	0.883	0.986	1/5	0.705	0.591
Mitra, Thomakos and Ulubaşoğlu (2002)	TURKEY 1983-1988-1990	0.65	0.987	1/200	≅1.00	≅1.00
Calfat, Flôres and Gáname (2003)	BRAZIL 1995	0.67	0.99998	1/50	0.941	0.921
	URUGUAY 1995	0.86	0.99951	1/2000	0.999	0.998

Given the freeness measures, firms would tend to relocate inside the US economy if the rest of the world were the relatively more open economy as a whole. In this exercise, $s_n^{US} = 1$ when ϕ^* takes the values of 0.83 and 0.87. By contrary the US economy would suffer a delocation process, $s_n^{US} = 0$, when ϕ^* equals 0.65 and 0.79[27]; that is when the rest of the world is comparatively more closed.

Calfat, Flôres and Gáname (2003) retrieve from the estimated reduced parameters of the common external tariff structure, the structural ones for Brazil and Uruguay[28]. Both parameters seem to be high for both countries. This fact gives as outcome a high value of freeness for both economies. Considering parameters of Brazil, one could expect a relocation process favouring this country only when the rest of the world would not use trade policies as a protective barrier, that is for a $\phi^* \cong 1$.

Finally, as table 1 shows, small economies, such as Turkey and Uruguay present a level of freeness quite near to 1. With these levels, both economies would suffer a delocation process independently of the level of freeness of the rest of the world.

[27] The two values of ϕ^* are related with the two values of ϕ calculated for the US economy. The thresholds ϕ^* are calculated considering equation (20). The share spending is estimated considering the household final consumption expenditure of the 207 countries taken from the World Bank Indicators database.

[28] Only these two countries of Mercosur present completely significant results.

6. Concluding Remarks

This paper has aimed to explain the determinants of industry location and the divergences that may arise among nations when incumbents select the trade policy endogenously. The model incorporates in an economic geography setting the political standpoint of why governments may select trade policies in a way that they are far from the ones that maximise the general well-being. Particularly, two different backgrounds have been combined in order to characterise the political game and the economic structure. The G-H model has usefully served to characterise the political game due to the fact that it provides microfoundations for the payers' behaviour. The FC model has provided the economic structure in which capital owners have the incentive to move their endowment between regions. This model gives the direction of industry location and the plausible explanations for relocation to occur. Since both models share the attractive feature of being relatively tractable, the author believes that their consideration in building up a simple background, is a useful approach.

As can be expected, predictions that are derived from the influence of political variables are the same as those of the G-H model. All things considered, a relevant government's concern about the welfare of the general electorate will predict a high level of freeness. Though competition among lobbies is not present in this setting, as the share of voters who are members of the interest group increases, the level of trade freeness also increases. The deadweight loss that the lobby faces when a high tariff is implemented increases with α_g, but the extra profits that the group as a whole can derive do not change. When the negative impact in the welfare's lobby becomes relatively more important than the positive effect of the extra benefit due to the positive change in the tariff, the lobby does not contribute. In fact, as truthful contributions reflect the marginal change in the lobby's welfare, a negative impact prevents the lobby to bid for protection.

Two new appealing insights come from the consideration of the monopolistic competition structure. Firstly, in this setting the interest group seems to be more worried to persuade the government to set a high tariff when it can charge a low mark up. This insight is in line with the argument presented by Baldwin and Nicoud (2002) in *entry and asymmetry lobbying: why governments pick losers*. In fact, authors combine a standard monopolistic competition model with the G-H model, differently from how it is done here, to answer the paradox of why losers obtain more protection via a *factor subsidy*. They explain the asymmetric incentive of why interest groups fight harder to avoid losses than they do to win new gains due to an asymmetric appropriability. Secondly, the initial distribution of industry might also influence the structure of

protection in one economy. On the one hand, the presence of a high number of firms in such economy involves a tight level of competition among firms that tends to erode the potential gains that capital owners would derive from the protectionist policy. In this situation, lobbying activity might become less fruitfully. On the other hand, if the number of firms might reflect a measure of the lobby's political power, a higher number will magnify the potential gains from protection. Hence, the lobby would be more disposed to bid for protection. When an economy is too closed, the industry share is not a relevant variable in the determination of the trade policy.

The trade policy endogenously determined becomes the channel to understand how the behaviours of a single lobby and an opportunistic government impact on the long run spatial distribution of industry. When the rest of the world is a free trader and the spending share of that economy is relatively small, the marginal change in trade policy has a relevant impact on the industry share. Amazingly, if a small economy is characterised by a government that is not very much concerned about general welfare and there is a vigorous lobby of few capital owners that play actively, the possible outcome will be a relocation of industry that favours such economy. Capital owners might make capital flow to look for *protection*.

The consideration of political variables may bring into scene a dispersion force that influences the definition of the economic landscape picture. This insight is also present in several studies in which a political economy background and an economic geography model are interrelated. In fact, Baldwin *et al.*[29] (2003), considering the voting model and the FC model to analyse the effect of an endogenous location subsidy, emphasize that the equilibrium industry share of one region is increasing with the market size (*the home market effect*) but decreasing with the ideological heterogeneity of that economy (what Robert-Nicoud and Sbergami call *the vote market effect*).

Ottaviano and Thisse (2002) generalise the effect of the political determinants on the spatial distribution of firms. In a FE linear model, the authors introduce the political game to see which group, the skilled and/or unskilled workers, will have the incentive to form an interest group. Authors analyse how lobbies will influence a political choice between *free mobility* and *mobility barriers*. The political game in this case might lead to an agglomerated or dispersed equilibrium depending on the surpluses that players derive from both alternatives and on the level of trade costs. In this model, a second best optimum can be achieved due to the political game.

Finally, the last remarks are going to be the guide for potential future improvements and extensions of this paper. Firstly, it would be interesting to consider other region to characterise

[29] Chapter 18 "The political Economics of regional subsidies" based on Robert-Nicoud and Sbergami (2001).

not only the impacts of the unilateral change in the endogenous tariff but also to analyse the effects of trade integration processes on the spatial distribution of firms. Secondly, though for the sake of simplicity the author considers the political game only in one country, political variables should also be modelled in the foreign country. Grossman and Helpman (1995 a, b) take into account the international political dependency shaping two levels of strategic interaction; one in which governments set trade policies facing international restrictions, the other in which the incumbent deals with its internal political system. Thirdly, the model should be extended to analyse not only the effects of an *ad valorem* tariff but also the other sorts of trade policy, particularly the ones that are non-tariff barriers. This extension should take into account the important remark set by Behrens *et al*. (2003). The authors clearly advise that *the way trade and transports costs are modelled is not neutral for the nature of the results* in an economic geography setting. In fact, depending on whether they are modeled as iceberg costs (ad-valorem tariff) or linear costs (non tariff barriers), their impacts on the economic landscape may be different. Hence, the authors stress the need for more realistic specifications in which both kinds of costs are accounted for.

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